SOFT & COCONUT

FOOD AND ALLIED INDUSTRIES NEWS

VOLUME III No.1 - 1985

ECONOMIC & MARKET INFORMATION CELL

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CENTRAL FOOD TECHNOLOGICAL
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C O N T E N T S

MARKET INTELLIGENCE

1. Market Intelligence

1.1 Food Industries - New units

Name of the Unit	Proposed location	Product	Proposed capacity
1. State Oil Seeds Growers Coop. Federation.	Ujjain (M.P)	Soya Product	800 Tons/day
-do-	Malwa (M.P)	-do-	800 Tons/day
-do-	Sehore (M.P)	-do-	800 Tons/day
2. Union Govornment. Undertaking	Bhagalpur (Bihar)	Mango Pulp	
-do-	Silchar (Assam)	Pineapple Juice	
3. North-Eastern Council Undertaking	Manipur	Pineapple products	80,000 Tons/year
4. Karnataka Milk Products		Milk powder	50,000 Tons/year
5. Bihar Fruits & Veg. Dev. Corporation	Hajipur	Tomato paste	335 kg/hr

1.2 Diversification of Products

Unit	Products
i) Khosla extractions	Soya based foods
ii) Maheshwari Proteins, Ratlam,	Soya based products
iii) Britannia, M.P.	Soya based oil and proteins
iv) Sagar Soya products	Texturized soya and protein concentrates.

1.3 New food products

Unit Address	Items of manufacture
1. Parry & Co., Bombay	Milk Chocolates
2. Midland Fruit & Veg. Products.	Frozen foods (Brand Name: Bwarchi)
3. Welga Foods Ltd., Budaun	Frozen French Fries
4. Anand Enterprises, New Delhi	Instant Soft drink mix (Brand Name: MARINAS)
5. Maize Products, Ahmedabad	Liquid Glucose, Starch, Maprabata & Custard powder.
6. Dr. Writer's Food Products	Milk chocolates (Chocrack and Fonda)

...2/-

2. Technology Intelligence

2.1 New process/techniques developed

Organization	Process
1. N.D.R.I., Karnal	Vegetarian Cheese
2. Biochemistry Research Institute, IIT, Delhi	Alcohol from Rice Straw
3. Nimbkar Agricultural Research Centre, Phaltan, Maharastra	Gur from Jowar stems
4. R.R.L., Trivandrum	White pepper products from Black pepper
5. R.R.L., Trivandrum	Separation of chilly oleo-resin into two fractions - High pungent fraction and natural chilly colour from pungency

2.2 New machinery/equipment developed

Indian

Organization	Machinery/equipments
1. B.H.E.L., Tiruchi	Fluidised bed boiler
2. Larsen & Toubro, Bombay	Steam Jet Chiller
3. Central Tuber Crop Research Institute, Trivandrum	Tapioca Chipping machine
4. Indian Inc. Corpn. Faridabad	Caps for ketchup bottles
5. Energy Machines, Bombay	Steam Boiler
6. ACMEVAC Sales (P) Ltd., Bombay	Bottle Filling machine
7. H.M.T. Ltd., Dairy Machinery Unit, New Aurangabad	Milk separator and butter machine
8. A.T.E. (P) Ltd., Bombay	Ultra high temperature Milk system.
9. H.M.T. Ltd., Dairy Machinery Unit, Aurangabad	Plate Heat exchanger
10. Yatrik Engineers (P) Ltd., Pune	Gum Tape Dispenser for sealing corrugated and flexible cartons.
11. Ambas Corporation, Bombay	Reclosable Polythene Bag for packing food products.

Other countries:

1. Hollymatic AG, Switzerland	Complete Meat/Fish/Poultry processing line.

Indian Agents:

Vindhyachal Process Corpn.
116, Malviya Nagar
Bhopal-462 003, M.P.

3. Government Policy - Food Industries:

In view of the need to stimulate industrial growth and simplify the industrial licencing policy and procedure according to the Press Note No.7 (1985 series, Ministry of Industries and Company Affairs, Department of Industries, that no industrial licence will be required under the provision of the Industrial (Development and Regulation) Act, if the following conditions are fulfilled.

i) The industrial undertaking does not fall within the perview of MRTP Act of FERA;

ii) The article of manufacture is not reserved for small scale sector;

iii) The industrial undertaking is not located or proposed to be located -

a) within the standard urban limits, as determined in Census of India, 1981, of a city having a population of more than 10 lakhs, or

b) within the municipal limits of a city with a population of more than 5 lakhs, as determined in the said census.

Following are the lists of food processing units:

i) Canned fruits and vegetable products, protein and processed foods, vegetable based weaning food, marine products and cattle feed.

ii) Vegetable oils, namely:

a) Solvent extraction of oil/oil cakes from minor seeds excluding cotton seeds.

b) Rice bran oil

4. General information:

Upward trend in Marine exports:

As per provisional figures available with Ministry of Commerce, 59,500 tonnes of Marine products valued at Rs.2,753.1 million were exported during April-December 1984. The trend indicates that a target of 93,800 tonnes worth of Rs.4,000 million will be achieved during the year 1984-85.

Among the main items exported are frozen shrimps which in terms of value comprised 84% and in terms of quantity 59% of the total quantity of marine exports, during 1983-84, with 54,444 tonnes valued at 3,148.1 million.

Export of frozen fish came next with 22,573 tonnes worth Rs.291 million. The major export markets are Japan and U.S.A., which account for 64.4 and 13.35 per cent respectively of country's export of marine products in terms of value and exports. The third largest market is U.K. which has a 5.5 % share. Other buyers account for less than 3% each of Indian export are Singapore, U.A.E., Kuwait, Netherlands, Taiwan, France & Sri Lanka.

Government of India is taking several measures to promote the exports of shrimps and also to obtain better export price for this item by subsidising rates for insulated boxes, construction of fish landing platforms, setting up of frozen storages at Calcutta and Cochin, providing refrigerated trucks to exporters and also through quality control inspections at the processing

stage and before final shipment. Trade promotion offices have been set up at New York and Tokyo with a view to entering new markets and information of market trends in the European market is obtained from the India Trade Centre at Brussels.

Besides shrimp and frozen fish, frozen lobster tails, frog legs, cuttle fish and fillets, squids, dried fish and shrimp, shark fins and maws also find markets outside the country.

SOFT DRINKS --- A PROFILE

1. INTRODUCTION

The term " soft drink " is universally recognised and widely used. The various types of products in the market include --

1.	Carbonated beverages	:	Clear and cloudy
2.	Non-Carbonated beverages	:	Squash, Cordials, etc
3.	Specialist product	:	Ginger, grape, cream soda and stimulating beverage, such as cola and root beer

For the purpose of this project, we shall concentrate only on carbonated soft drinks. According to the ISI definition, carbonated beverage should mean, non-alcoholic beverage saturated with CO_2 in properly sealed containers in a manner which ensures freedom from spoilage.

The typical soft drink is based on the following ingredients: Fruit juice, essence, flavouring usually in the form of emulsions, colors, preservatives, heading and/or clouding agents, acidulants, sugar and/or artificial sweetening agents and water. In many countries the composition and description of this group of products is controlled by legislation to which reference should be made, particularly with regard to the nature and quality of any permitted additives.

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2. SOFT BEVERAGE INDUSTRY IN INDIA

In India, all categories of soft drinks are being made. While carbonated drinks are most popular, still beverages are not manufactured to any significant extent in the organised sector. In 1982 there were 45 major units registered with the Directorate of Technical Development, engaged in the manufacture of carbonated beverages. They had an aggregate installed capacity of 2078 million bottles per year, against which the production was 1,650 million bottles.

Though soft drink industry has made significant progress during the last several years in terms of production there is only a limited range of flavours such as cola-type, lime, lemon, orange, ginger etc. available to the Indian consumer. A beginning is made at CFTRI, Mysore, where coffee & Tea based soft drinks have been developed and tested on a laboratory scale.

The monopolistic trend evident with soft drink industry in India is largely due to the excellent consumer acceptability enjoyed by the brand names, developed and manufactured as per the technical know-how of foreign origin. The total absence of research and development in this particular field has made the task easier for these brand products to monopolise the Indian market without any competition or challenge worth the name. An urgent requisite for indigenous development of the industry is establishment of a research centre where 'product development and quality evaluation' can be given top priority. Any such effort should have active participation of the industry so that only relevant areas are taken up for intensified development. There is very good scope for at least a dozen new products that can be marketed successfully provided they are comparable to

those being, manufactured based on imported technology. Excellent scope exists for products developed with some of the locally popular indigenous flavours from herbs, spices, fruits, etc.

High cost of containers and refrigeration have already escalated the selling prices of soft beverages to such an extent that they are no more available to a large section of the population with limited incomes. Possibility of minimising the cost of production deserves urgent attention. Instead of manufacturing the ready-to-serve beverages, thought should be given to marketing concentrates with high degree of carbonation. Another area which has been neglected so far is the development of automatic dispensers and vending machines. Such devices can dispense the final product into the glass, the reducing the cost of bottling and transportation. At least in large industrial establishments, there is a scope for installation of automatic dispensers.

Effervescent tablets capable of giving a ready-to-drink beverages when put in a suitable quantity of water have been developed in many countries. However in India such products of good quality are not yet popular. There are several limitations which have to be overcome before a satisfactory product could be marketed.

One of the major constraints faced by soft drink manufacturers is the non-availability of standard raw materials such as sugar, color, flavour, CO_2, clouding agents etc at reasonable cost, besides the high cost of manufacture. Added to this bottles and crown corks are becoming dearer. The industry has demanded, supply of sugar at controlled rates so that the cost could be brought down considerably. Probably this is a genuine

requirement, and, if conceded, can go a long way in developing this industry on a sound footing, besides making the soft drinks available to consumer at cheaper prices. There is a lot to be gained by intensifying developmental activities in formulating a few internationally acceptable soft drink concentrates and promoting them with sustained effort.

It is quite possible that soft drink industry can look forward to a moderate growth in terms of qualtity and quality of production.

3. PROCESSING

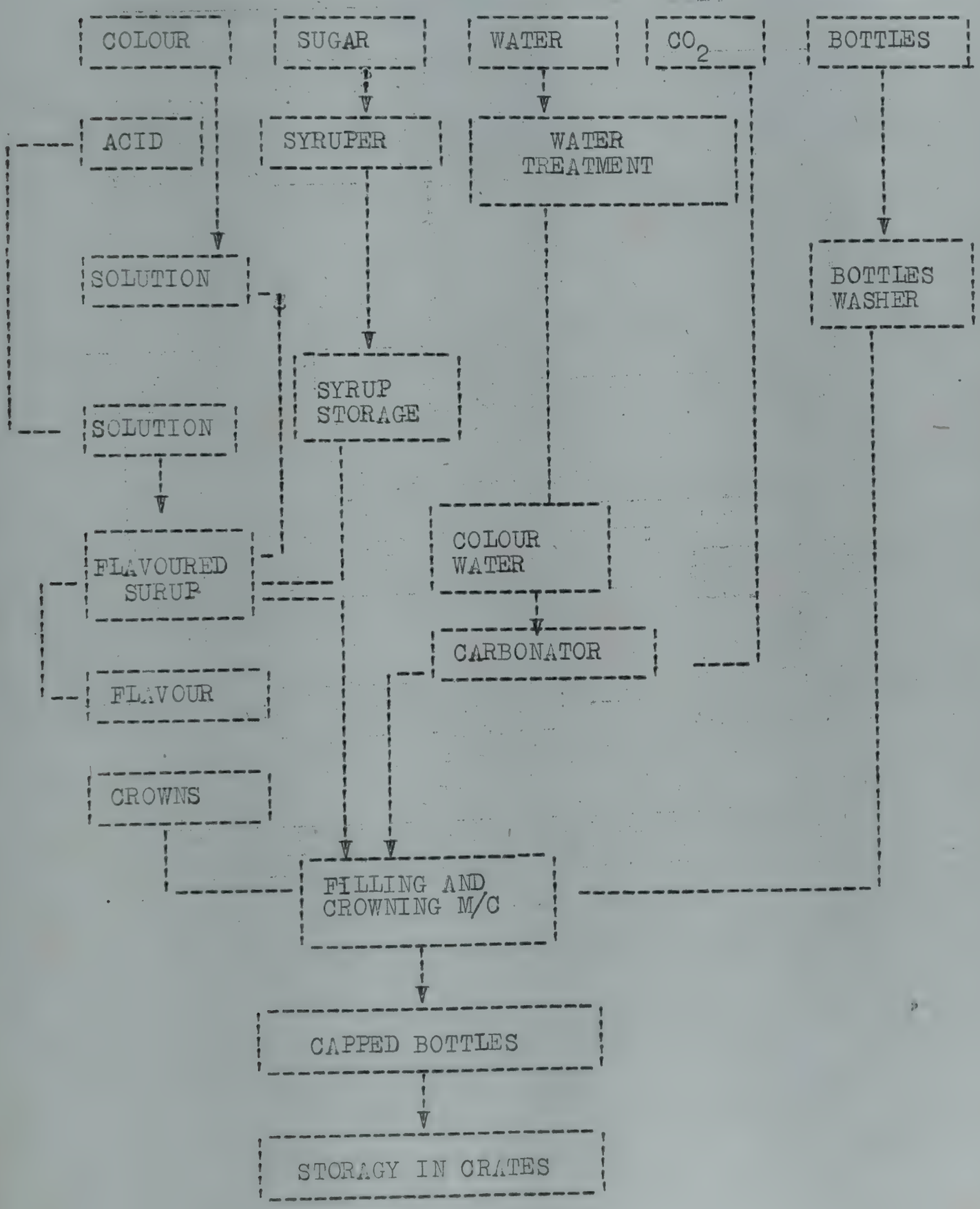
There are number of soft drinks in the market such as cola, orange, lemon, lime, ginger etc manufactured by a few well-known beverage companies. These beverages can be broadly classified under three distinct categories:

1. Carbonated beverages (acid or non-acid type)
2. Sparkling waters (soda and carbonated waters)
3. Still beverages (with natural or artificial flavouring).

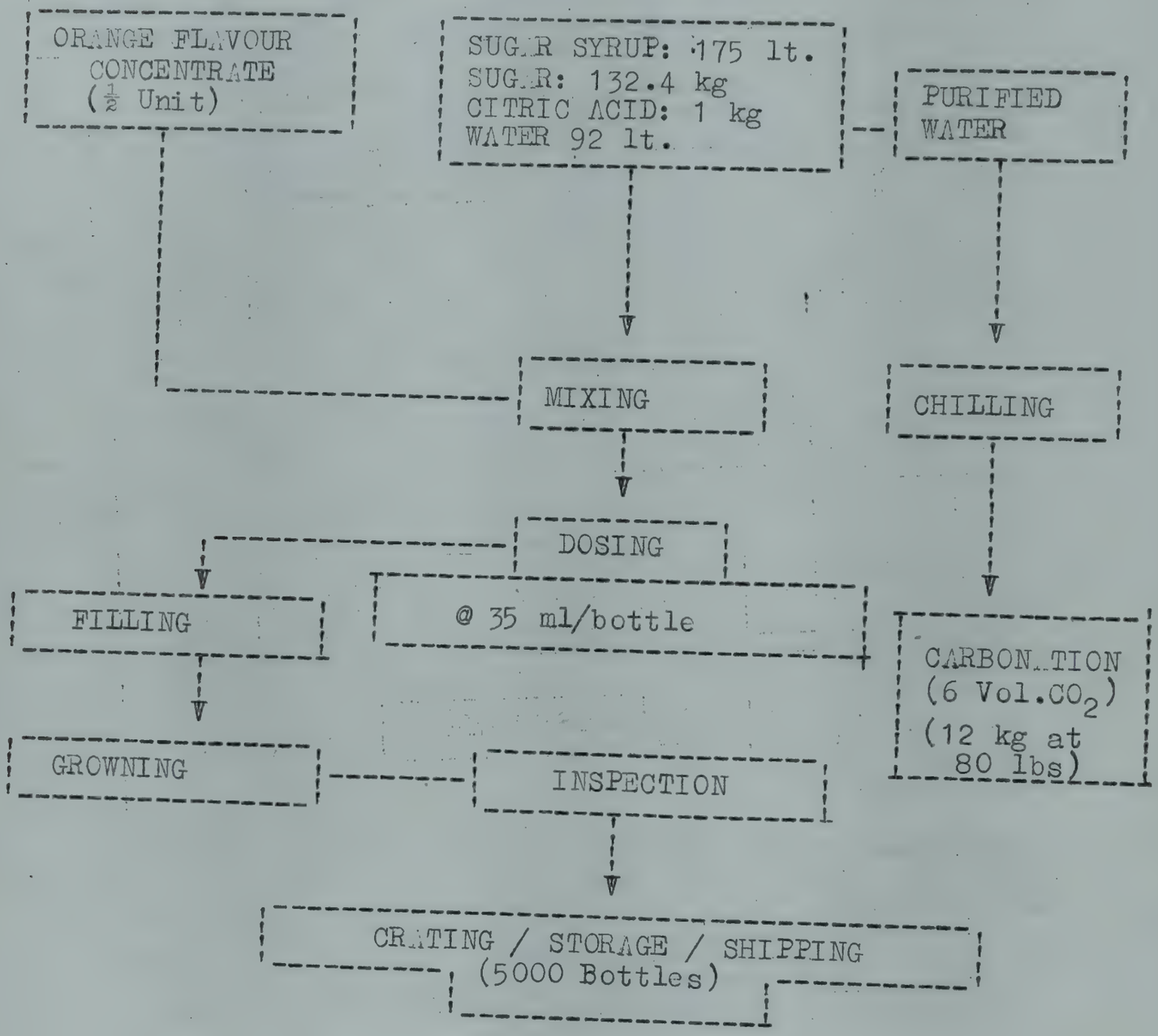
While sugar is the basic ingredient of carbonated and still beverages, sparkling water also known as soda, carbonated water or aerated water is made from pure water with or without addition of minerals or salts. Still beverages do not have any CO_2 in them and they are prepared from sugar syrup, colour , fruit flavour and water.

FLOW DIAGRAM

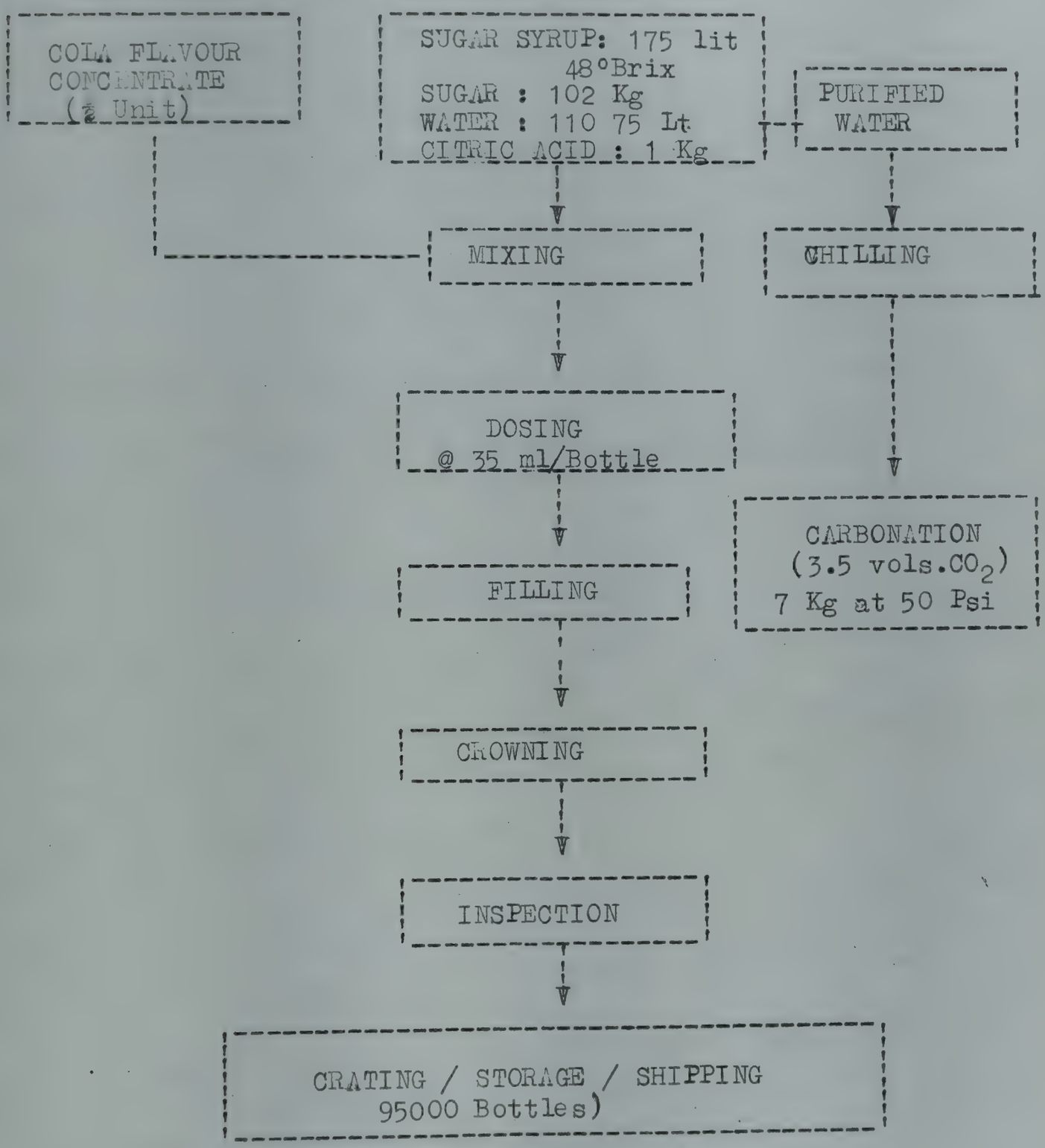
The following Flow Diagram indicates the various steps involved in the manufacture of bottle carbonated beverage:



MATERIAL BALANCE, ORANGE FLAVOURED - CARBONATED



MATERIAL BALANCE -- COLA FLAVOURED - CARBONATED



Typical composition of some soft drinks are given in the following Tables:

Type	Character	Total solids (ppm)	Carbonation (volumes)	pH
* Sparkling water	Mildly saline	250-1000	4-5	4.5
Club soda	-do-	1000-2000	4-5	5.5
Vichy	Very saline	2000-3000	4-5	5.0

* Sparkling water refers to carbonated water with or without added salts.

Composition of carbonated beverages

Type	Sugar in ° Brix	Carbonation in Gas volume	Acid in %	pH
Lime	9.17	4.0	0.140	3.02
Lemon	11.18	3.2	0.120	3.07
Orange	13.40	2.3	0.193	3.39
Cola	10.50	3.4	0.090	2.60

In spite of diverse types of soft drink being manufactured by different firms, the raw material employed and their functional properties do not vary much.

5. QUALITY CONTROL

5.1 ISI SPECIFICATIONS

Indian Standard Institution has laid down Specification for carbonated beverages:

All the ingredients used in the preparation of carbonated beverages shall be clean, pure and fit for human consumption.

Portable Water:

'Portable Water' means any water which is suitable for drinking and domestic purposes. Portable water shall be colourless, clean, odourless and pleasant to taste.

Specification for industrial water shall be following:

	Maximum
Turbidity	2 ppm (on silica scale)
Colour	Colourless
Organic matter (albuminoid ammoniacal nitrogen)	0.05
Odour	None
Free chlorine	0.2 ppm
Total alkalinity as calcium carbonate	85 ppm
Sulphate as SO_2	225 ppm
Chlorides as Cl	225 ppm
Iron and Manganese	0.3 ppm
Copper	0.2 ppm
Calcium as calcium carbonate	150 ppm
Magnesium	80 ppm
Floride	1.0 ppm

Lead	0.2 ppm
Arsenic	0.1 ppm
Total soluble solids	850 ppm
Nitrates	20 ppm
Nitrites	Nil

The bacteriological standards of the water used for making carbonated beverages shall be as follows:

a) The total number of bacteria developing on agar plates incubated for 24 hours at 37°C shall not exceed 100 per ml from not less than 2 plates, showing such numbers and distribution of colonies as to indicate that the estimate is reliable and accurate.

b) Not more than one out of 10 ml portions of any sample shall show the presence of the organisms of the coli-group and that shall not be of faecal type. In other words, the colon index of water shall not be more than one; colon index being defined as the number of B. coli organisms per 100 ml of water.

CO_2

Specification for CO_2, industrial, conform to the following:

a) It shall not contain any extraneous mineral or organic substances (e.g. SO_2, H_2I etc.)

b) The colour and flavour of the gas, as well as the odour and the flavour of the distilled water saturated with it shall have the characteristics of carbonic acid. The carbonated beverage shall, however, have a minimum of one volume of CO_2

Sugar Content

In the case of sweetened carbonated beverage, the product on being tested after removal of CO_2, shall record a Brix hydrometer value of not less than 5 degrees at 20°C.

Note: The requirement shall not apply in the case of dry gingerals and tonic water.

Flavouring Agents

The use of coumarin and dihydro coumarin as flavouring agents and diethylene glycol monoethyl ether as a solvent for flavouring agents is prohibited.

Food Colours

Food colours are permitted under and conforming to the Prevention of Food Adulteration Rules, 1955.

List of permissible harmless food colours:

The following natural colouring principles whether isolated from natural colours or produced synthetically may be used in or upon any article of food:

i. Cochineal or Carmine
ii. Carotine and carotenoids
iii. Chlorophyll
iv. Lactoflavin
v. Caramel
vi. Annatto
vii. Ratanjot
viii. Saffron
ix. Curcumin

Acidulants

The following acidulants may be used: Citric acid, ascorbic acid, tartaric acid, phosphoric acid, lactic acid, malic acid and acetic acid. No mineral acid, other than phosphoric acid, should be used.

Clouding Agents

Brominated edible vegetable oils - in such a concentration as not to leave more than 80 ppm of bromine in the finished product.

Foaming Agents:

The following foaming agents may be used:

Almumin, carboxymethyl cellulose, gelatin, licorice and its derivatives.

Caffiene: Not more than 200 ppm.

Quinine Salts

Not exceeding 100 ppm, calculated as quinine sulphate.

Preservatives

The limit and nature of food preservatives used in carbonated beverages shall be in accordance with the FFA Rules, 1955. Permitted preservatives are: (a) Benzoic acid including salts thereof; and (b) Sulphurous acid including salts thereof. Only one of the preservatives

will be used. For sweetened ready-to-serve beverages i.e., soft drinks, preservative is,

Benzoic acid - 120 ppm

or

Sulphurdioxide - 70 ppm

Trace elements

The carbonated beverages shall not contain more than 0.25 ppm of arsenic, 0.5 ppm of lead, 1.5 ppm of copper and 0.5 ppm of iron respectively.

Microbiological Conditions

a) Total colony count: The total number of colonies of bacteria developing on nutrient agar plate incubated for 24 hrs at 37°C shall not exceed 100 per ml.

b) Presumptive coliform organisms: This, when determined shall not exceed one in 100 ml.

c) Viable yeasts and moulds: Viable yeasts and moulds when tested shall not be more than two in one ml of the product.

Containers

The carbonated beverage shall be filled in glass containers. The head space in filled bottles shall be 50 ± 6 mm.

Labelling

The following information shall appear legible on each container, crown corks of label; labels, if used, shall be clean, neat and pasted securely:

a) Name of product

b) Name and address of manufacturer; and

c) Any other declaration required under the PFA Rules, 1955.

The container crown cork or lable may also be marked with the ISI Certification Mark.

5.2 PFA SPECIFICATIONS

According to PFA Rules, carbonated water has been defined as "portable water impregnated with CO_2 under pressure and may contain any of the following, singly or in combination: sugar, liquid, glucose, dextrose monohydrate, invert sugar, fructose, honey, saccharine not exceeding 100 ppm, fruit and vegetable extractives, and permitted flavouring, colouring matter, preservatives, emulsifying and stabilising agents, citric acid, ascorbic acid, edible gums referred to in the Indian Pharmacopoeia, edible gelatine, albumin, licorice and its derivatives, salts of sodium, calcium and magnesium, vitamins, caffiens not exceeding 200 ppm and quinine salts not exceeding 100 ppm (expressed as quinine sulphate)

Standards for carbonated beverages as per PFA Rules are:

Suagr	: Not lessthan 5%		
Sulphur dioxide	: Not more than 70 ppm	- to be declared	
or			
Benzoic acid	: Not more than 120 ppm	-	-do-
Coal tar dyes	: -do-	0.2% -	-do-
Sodium saccharine	-do-	100 ppm -	-do-
Lead	-do-	2.5 ppm	
Copper	-do-	1.5 ppm	
Arsenic	-do-	0.25 "	
Zinc	-do-	5.0 "	
Tin	-do-	250 "	

5.3 FPO SPECIFICATIONS

Specification for Synthetic Beverages (Flavoured sweetened - Aerated water)

(Sweetened aerated water with no fruit juice or fruit pulp or containing 10% of fruit juice or pulp).

Product	Variety	Total Soluble Solids
Flavoured sweetened Aerated Water	Sweetened Aaerated waters with single or composite flavours	Minimim 8%

General Characteristic & Definition

Aerated water means portable water, impregnated with CO_2 under pressure in properly sealed container and may contain any one of the following single or in combination.

Sugar, liquid glucose, dextrose, honey, [illegible], invert sugar, fructose, saccharine, not exceeding 100 ppm, fruit and veg. extractives (10% on weightto weight basis) and permitted flavouring, colouring matters, vitamins, preservatives, emulsifying and stabilising agents, citric acid, tartaric acid, phosphoric acid, malic acid, salts or sodium, calcium and magnesium, caffine not exceeding 200 ppm and edible gums and gelatin. The product shall not contain less than 5% total sugars of the net contents weight to weight.

There is a move to remove FPO Specification, though it is not yet being enforced.

5.4 PACKAGING SPECIFICATIONS

The consumer is informed about the contents of the soft drink through labelling requrement under FPO. Each soft drink lable has to be approved by the Competent Authority and displays the brand name along with the other information about its contents. The manufacturer's licence number, lot number and date of manufacture are also meant to be displayed on the side labels. Information such as: "Manufacturer's name; 'brand'; sweetened carbonated beverage: contains no fruit juice artificially flavoured, FPO number .....; contains permitted class II preservatives; contents 200 ML" is squeezed on the bottle top, which invariably is thrown off before the bottle is offered for drinking.

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6. MARKET POSITION

In India, all types of drinks are being made. Among the non-alcoholic group, carbonated beverages are most popular in Indian Market.

Though soft drink industry has made significant progress during the last several years in terms of production, there is only a limited range of flavours available to Indian consumer.

The table given below shows the details of some of the popular drinks present in the Indian market:

Product Name (1)	Manufacturer's Name (2)	Flavour (3)
Thums Up	Parle	Cola
Campa-Cola	Pure Drinks	Cola
Thril	McDowell	Cola
Cola-lite	Pure Drinks	Cola
Do-It	Parle	Cola
Campa Orange	Pure Drinks	Orange
Rush	McDowell	Orange
Rasika	Modern	Orange
Sparkling soda	McDowell	Soda
Sprint	McDowell	Lemon
Limca	Parle	Lemon
Tripp	Pure Drinks	Lemon
Campa	Pure Drinks	Lemon
Energee	Aarey Milk Unit	Milk Base
Mangola	Duke	Mango
21	Lipton	Lime

In their efforts to stimulate sales, companies resort to a variety of activities. Advertising is one of the major activities by which the firm conveys persuasive communications to the target buyers. It consists of non-personal forms of communication conducted through paid media under clear sponsorship. Advertisements come in large variety of forms.

It is important to recognise this variety because it shapes the selling objective.

Some of the following advertisements of various drinks will help us to have an insight in the advertising objectives:

Mangola	:	There is more in Mangola More joy, more fun, more life
Thumps Up	:	Happy days are here again, Everybody is feeling, great on Thums-up
Campa Cola	:	Life is full of Campa-Cola times
Limca	:	Thirsti times Slimca times Limc times
Bisleri	:	It is doubli bubbli
Do-It	:	I am low calorie woman Do-it is for me

The first 3 advertisements depict the joy, fun and happiness of life in their drinks, while Limca advertisement goes for thirst quenching. Bisleri emphasises on more carbonation in it and Do-It on low calories. Also the

advertisements show that most colas are associated with high life-style image while the lime drinks project a Thirst quenching image. Orange drinks give the idea that they are great for young ones.

Companies spent crores of rupees for advertisements. Indian soft drink makers, together spend Rs.5 crores, a year 55% of which goes into an audio-visual compaigns.

Millions of consumers all over India consume basically two types of soft drinks. One category consists of nutritious fruit juice based soft drinks and other sweetened aerated waters (SAW). Though their retail prices are almost the same yet the market share of SAW's is many times more than juice-based drinks. The only reason for it is massive advertisement expenditure by aerated water manufacturers.

Advertising Expenditure on four TV Stations
(Jan. 1 to June 30, 1983)

Brand	TV Advertising Expenditure (Rs. in lakhs)
Thums Up	8.28
Campa-Cola	6.50
Thril	6.98
Cola-life	1.48
77	0.67
Gold Spot	0.60
Campa Orange	4.40
Limca	4.93
Tripp	4.44
Sprint	3.49
Tringler	0.82
Total	42.59
Rasika	1.44
Appela	8.58
Total	10.02

Table shows that, during the first six months of 1983, brands of SAW spent Rs.42.59 lakhs on TV advertisements, from Delhi, Bombay, Calcutta and Madras TV Stations alonw while fruit-based drinks - Appela and Rasika - Spent not even a fourth of this amount.

Capacity and production of soft drinks for years 1974-1982 is given and analysed below:

Capacity and Production in Soft Drink Industry (DGTD)

Year	Accounting Unit	No.of Units	Installed capacity	Production quantity
1974	Million bottles	34	1,731	631
1975	"	34	1,731	730
1976	"	34	1,731	670
1977	"	35	1,756	518
1978	"	35	1,756	625
1980	"	45	2,078	1,434
1981	"	45	2,078	1,550
1982	"	45	2,078	1,650

This Table shows that over the period of 8 years, the number of units have increased from 34 to 45 with an increase in the installed capacity from 1731 to 2078 million bottles. The growth rate for this period was 127.375 million bottles per year i.e., 20.19% per year.

The sudden decrease in the production quantity in the year 1977 was due to the removal of Coca-Cola from the Indian market.

Time Series Data of Aerated Water Production
(FPO Figures)

Year	Quantity (Tons)	Value (Rs. '000)
1961	16,550	13,667
1962	15,966	13,600
1963	24,183	20,939
1964	30,936	27,104
1965	40,430	36,873
1966	48,385	56,113
1967	48,990	60,026
1968	75,966	1,18,978
1969	1,08,036	1,54,536
1970	1,03,759	1,70,536
1971,72,73	NA	NA
1974	1,07,221	2,94,704
1975	1,16,545	2,87,516

According to these figures, the growth rate for first ten years (1961-1970) was 52.7%.

For the purpose of projecting the demand of soft drink production in the country, it was thought of using two variables viz., per capita income (x_1) and urban population (x_2). These two variables influence the production directly. An increase in per capita income

will have a positive effect on demand of soft drinks, while for the purpose of our calculation, we shall neglect the age group 0.5 years and shall take only 15% of the remaining urban population as only higher income group can afford them.

These two variables (x_1 & x_2) are very highly correlated (= 0.9598) and could cause autocorrelation. It is therefore advisable to use only one of the variables which is more related to the dependent variable ( ).

Hence, a linear regression equation was fitted with per capita income alone as the independent variable, using least squares. The equation then becomes:

$$Y = -1017 + 1.4972X \quad (\quad = 0.9441)$$

Using this equation the projected production of soft drinks for the years 1985 and 1990 is 2024 and 3054 million bottles respectively.

By a survey conducted in Bombay market, it is found that cola drink constitutes 21.5%, orange 65%, lemon 8% and fruit based 5.5% of the soft drink market. Hence for years 1985 and 1990, the demand of different flavours will be:

Flavour	Production (million in bottles)	
	1985	1990
Cola	435.16	656.61
Orange	1315.60	1985.10
Lemon	161.92	244.32
Fruit based	111.32	167.97
Total	2024.00	3054.00

New technologies:

Among the new flavoured products, whoyvit comes the first. Under the 'Whey Utilization Project', NDRI has developed 'Wheyvit' which is nourishing. Whey is a byproduct of paneer and almost 70 million litres of whey is annually thrown to gutters. This huge waste is utilized to product a soft drink - 'Wheyvit'. besides, coffee and tea based soft drinks are also developed and tested at laboratory scale in the Central Food Technological Research Insititute, Mysore.

Taxation and Price:

Soft drinks are considered a luxury and 40-50% indirect taxes are slapped on to them which put them beyond the reach of common man, each bottle costing 2.25 to 2.50. All soft drinks whether artificially flavoured or fruit based; are both treated alike for purpose of taxation by Government of India.

The retail price of soft drinks has shown an increase though a gradual one. In 1978-79 the average price of a soft drink ranged between Re.1 and Rs.1.25. In 1981-82, the price went up to Rs.1.50, 1.60 by 1983-84. The price had increased to about Rs.2. At present the price ranges between 2.25 and 2.50. On an average the manufacturing companies supply soft drinks at the retailer door step for about Rs.1.50.

A significant part of selling price of soft drink is accounted for by taxes both direct and indirect. The current rate of excise on each bottle is 30 paise. The current Sales tax in Maharashtra is 12%. In Delhi the rate is 7% and in majority of other states the rate is 7%.

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7. CONCLUSION

It is possible that 'soft drink industry' can look forward to a moderate growth in terms of quantity of production. The projection of production of years 1985 and 1990 shows that there is a scope for more production and demand of soft drinks in future. But studies show that demand or sales is, to an extent, affected by advertisement policies of the firm. Some blind tests showed that just by tasting the drink, consumer cannot differentiate about his/her favourite brand, that is, quality alone does not sell the product. Also, introduction of new flavours like coffee, tea, milk-based are likely to enter the market with the progress of time.

* * *

ANNEXURE - I

Q AERATED WATER Q

Sl. No.	Name of the Suppliers	Item Manufactured
1.	M/s. Pioneer Mechanical Works G.T. Road, Ambala	Semi-automatic M/c
2.	M/s. Gladwyn & Co., 251, D.M. Road, Fort, Bombay-1	-do-
3.	M/s. Raja Ram Bhiku & Sons New Prabhat Devi Road Dadar, Bombay-25	-do-
4.	M/s. M.K. Industries Plot No.12-A, Gali No.4 Rohtak Road, New Delhi	-do-
5.	M/s. Gardner Corporation 6th Doctor Lane New Delhi-1	Automatic M/c
6.	M/s. Hildon & Co., Plot No.101, Road No.B-16 MDC Chakala, Andheri Bombay-400 093	-do-
7.	M/s. Larsen & Toubro Ltd., Ballard Estate, P.B.No.278 Douggel Road, Bombay-1	-do-
8.	M/s. Mohan Ortmann & Herbest Ltd., F-79, Okhla Industrial Area Phase-20, New Delhi	-do-
9.	M/s. Breweries Engineering A-10, Lane No.4, Anand Prabat Industrial Estate, New Rohtak Road, New Delhi-5	-do-
10.	M/s. Mistri Saut Singh & Sons 3794, Mori Gate, Delhi-6	-do-
11.	M/s. Rita Agencies No.3, 1st Crescent Road Park Road, Gandhi Nagar Madras-20	-do-
12.	M/s. Oriental Machinery (P) Ltd., Mission Court 25, Rajendra Nath Mukherjee Rd. Calcutta-700 001	-do-

COCONUT - COMMODITY PROFILE

COCONUTS

A commodity Report

Coconut palm is one of the important tree crops of the world. Practically every part of the tree yields useful products to mankind. But inspite of its varied uses and the impact of the crop on the economy of the region where it is grown, scientific research was initiated only from 1916 onwards.

India was the first to take to systematic and scientific research in coconut crop. Research work was initiated in Kasargod and Nileshwar (in Kerala) as early as in 1916 and Kasargod station has now become the headquarters of the Central Plantation Crops Research Institute set up in 1970. Since coconut is grown not only in Kerala, but in other parts of the country too, like Karnataka, Tamil Nadu, Orissa, Assam and West Bengal, an All India Coordinated Project for the improvement of coconut crop was sanctioned by the Indian Council of Agricultural Research (ICAR) in 1971. The Institute has tried to develop crop combinations and cropping systems that would increase production of coconuts substantially.

Initial reports of the coconut crop prospects for 1980-81 are somewhat encouraging. Estimates are that production this year may be better than the 1979-80 crop which itself was 4 to 5 per cent lower than that of 1978-79 at 5471 million nuts.

Production of coconuts reached its peak of 6124 million nuts in 1971-72, but declined to 5851 million nuts in 1973-74 and output picked up to 6030 million nuts in 1974-75. Since then there has been a slide downwards to 5765 million nuts in 1976-77 and to 5413 million nuts in 1977-78. In 1978-79, however, there was a modest increase of one per cent leading the total output to the level of 5471 million nuts, in 1982-83 production was 5664 million nuts.

Data relating to production and yield suggest that the record of the fifties was far better than that of the following two decades. Per hectare yield of coconut at 7012 reached the highest level as far back as in 1953-54 when the area under cultivation was 663 thousand hectares. However, yield steadily declined to 6470 nuts in 1960-61 and further to 5696 nuts in 1965-66. It picked up somewhat during 1966-67 but continued to decline thereafter reaching an all time low of 5121 nuts in 1977-78. In 1978-79 the yield was marginally higher at 5127 nuts.

Thus in the absence of any spurt in productivity- actually there has been a decline- whatever increase in production took place in recent years has been on account of the increase in the area under cultivation. The phenomenon of stagnation affecting production and productivity of coconut crop has also been the result of various economic factors such as lack of credit, deficiencies in the supply of inputs, lack of necessary institutional infrastructure and uncertainty in market prices.

Statewise data reveal that Kerala accounts for more than half of the total coconut production. The state's share formed more than 56 per cent of the total output followed by Tamil Nadu, but a great distance, accounting for only 19 per cent of all India total. Four southern states - Andhra Pradesh, Karnataka, Kerala and Tamil Nadu - together accounted for nearly 94 per cent of the total coconut crop grown in the country.

Other major coconut producing states are Assam, Maharashtra, Orissa, West Bengal, Andaman & Nicobar, Goa, Daman & Diu, Lakshdweep and Pondicherry.

Kerala, the land of coconuts, has been consistently producing the bulk of the crop, but of late its share has been on the decline. As against this, Tamil Nadu, Karnataka and Andhra Pradesh are increasing their shares. Thus from 69 per cent in 1968-69, Kerala's share declined

to 56 per cent in 1978-79, showing a fall of 13 per cent in the course of one decade. In contrast, Tamil Nadu raised its production level from 735 million nuts in 1968-69 to 1057 million nuts in 1978-79, the increase being 44 per cent. Karnataka has nearly doubled its production in ten years from 449 million nuts in 1968-69 to 813 million nuts in 1978-79. Orissa, Goa, Daman and Diu also have gained significantly during the same period.

Coconut grows ideally in humid tropical regions. It adapts itself to a very wide range of soil conditions from littoral sand to clayey soils, ill-drained low lying marshes to well-drained hill slopes, strongly acidic peaty soils to alkaline calcious soils. In India, the west coast belt accounts for more than 80 per cent of the area under this crop.

Kerala takes the lion's share in the area as well. Cultivation of coconut is the life style of this state and its by-products generate a variety of employment and is the mainstay of the state's economy which is closely woven with the fortunes in coconut trade.

Coconut cultivation is carried on in all the 11 districts of Kerala, but the state has three physiographic regions, high land in the east, midland and lowland in the west coast. Coconut cultivation is mainly confined to the lowland bordering the coast with a level topography and to midland with an undulating terrain and elevation upto 100 metres and most of the crop is grown under rainfed conditions. Coconut crop in Kerala was spread over an area of 6.8 lakh hectares in 1978-79, forming 63.6 per cent of the All-India total area of 10.7 lakh hectares under this crop.

In Kerala, Kozhikode district takes pride of being first both in production and acreage, closely followed by Cannanore and Quilon in respect of area but not in production. Trivandrum takes the second place as regards production.

Karnataka and Tamil Nadu are other major states where coconut cultivation is carried on, on an extensive scale. Karnataka has around 1.6 lakh hectares under coconut cultivation. Tumkur, Hassan and Chitradurga are the three major districts, both in area and output. South Kanara, Mysore and Mandya are other important coconut growing districts.

With a total area of 1.1 lakh hectares, Tamil Nadu occupied the third place in 1978-79. Thanjavur District topped both in acreage and production. Kanya Kumari, Coimbatore, Dharmapuri and Salem are other important coconut growing districts in Tamil Nadu.

Statewise and districtwise data relating to production and their relative share for 1977-78 is given in Annexure.

Coconut cultivation is mainly a small holder's crop. Over 90 per cent of the holdings are less than one hectare in area. Percentage of holding in different regions reveals that Karnataka has the largest number of small holdings followed by Andhra Pradesh and Tamil Nadu. In most of the coconut growing states, the crop is grown in homestead gardens and obviously in small holdings. The relative percentage share of states as regards are- and production for 1978-79 and 1977-78 is presented in Table. Annexure.

All India index numbers of area, production and yield reveal that there has been only a modest expansion in area under the crop, but a clear fall in productivity.

A major barrier in increasing coconut output has been its low yield. There has been a near stagnation in productivity from the early part of the sixties.

Per hectare yield was the highest in Tamil Nadu in 1978-79 at 9523 nuts which reflected an improvement over 1977-78 level of 9446 nuts. But in Kerala which produces the maximum output, yields were below all India level both

in 1977-78 and 1978-79 at 4530 and 4529 nuts respectively. In Karnataka productivity was slightly higher with 5212 nuts per hectare in 1978-79 than the all India average of 5127 nuts.

This slump and stagnation in productivity is the offshoot of various factors. As coconut trees take 5 to 7 years to bear fruit, the cultivator is generally anxious to get the maximum return from the available land seldom observes the principles of spacing and density and grows a variety of crops along with coconut in a haphazard manner. Research in this field has shown that only some combinations of crops are compatible while others are in-compatible resulting in over population and consequent reduction in yield. Added to this is the prevalence of serious disease like ons limited (wilf) disease and stem bleeding, which hamper productivity considerably.

Kerala provides the best example in this regard. It is scientifically estimated that spacing of one hectare of land can accommodate only 175 palms, whereas in reality there are 225 palms per hectare in that State. As a result plants in such close proximity compete for existence and the pests and diseases that ravage the coconut gardens contribute further to bring down the yield.

Low yield has been the bane of coconut crop since late sixties. Insects, pests and fungus diseases have been the root causes of India's poor coconut yield. It has been noticed that some 751 different kinds of insects attack the coconut tree at various stages of its development. But among them the most harmful is the rhinoceros beetle, a stout black beetle with horn projected upwards. It bores through into the crown of unopened coconut leaves, chewing and cutting them, thus harming the tender foliage. The result is that when leaves comex out, their surface is dwarfed and the growth of the tree is affected. This reduces the yield and ultimately renders the palm bare.

Kerala is the worst affected State with this dreaded disease. The Central Coconut Research Station at Kayamkulam in the southern part of Kerala is India's pioneer research centre for pests and disease control studies. This centre has got 61 acres of coconut garden, with more than 3,000 coconut palms at different stages of growth. Research is carried on here on plant pathology, which includes virus pathology, plant physiology, soil chemistry and entomology.

Other major maladies that affect the coconut trees are root (wilt) and leaf rot diseases. Here too Kerala is the worst affected region. Nearly one-third of coconut growing area in the state is affected by this devastating root (wilt) disease which is known in vernacular (Malayalam) as "Verucheeyai". This disease was first detected in 1882, after the heavy floods in Kottayam and Alleppey districts.

Plants in all stages of growth are affected by root (wilt). A conservative estimate places the loss due to this disease incurred by coconut growers around Rs.300 million annually.

Perhaps coconut is one of the few crops, the usefulness of which cannot be over-exaggerated to the area in which it is grown. In fact every part of the product is put to one or the other economic uses.

Copra, coconut oil, oilcake, coir and charcoal are the major products of coconut. These are again put to further use in a diverse range of manufactured products, either for human or for animal consumption.

It is roughly estimated that 53.9 per cent of all the coconut produced are used for household consumption, 3.5 per cent for tender nuts and 42.6 per cent for production of copra.

Generally it can be said that price trends both in coconut oil and copra is dependent on the availability of coconuts and its price in the market or in other words they show an inverse relationship with the coconut production cycle.

Coconuts are harvested throughout the year; nonetheless, the production pattern itself is highly seasonal. About two-thirds of the harvest of the total produce is gathered from January to June and the remaining one-third is collected in the latter part of the year.

Coconut cultivation and related activities offer employment to about 10 million people in the country. Besides, most of the activities are labour intensive in nature.

The National Commission on Agricultural has projected that our requirements of coconuts by 2000 A.D would be 138,585 million nuts. That is more than two times of our present production.

In large scale cultivation coconut crop alone will yield around Rs.5,000 per hectare under rain-fed conditions. But if an economically feasible crop combination is practised, under effective management, it is estimated that the total annual income would rise to Rs.17,700 per hectare.

High yielding varieties is a sphere where significant research has taken place. In 1980, crop improvement work was started when a dozen different types of palm from countries like New Guinea, Java, Philippines, Fiji were brought to India and planted at the Coconut Research Station Pilicode for evaluation and selection.

INDUSTRIAL UTILIZATION OF COPRA

To meet the demands of coconut oil-based industries coupled with the advantages in moving copra from the State in place of oil (purchase tax about two per cent for copra) like tax benefits, the big houses are making large purchases from markets like Alleppey, Calicut and Badagara.

The local millers are critical of the indifference of the State Government in lending a hand to help the units at least in running at an optimum level. Many milling units are finding it very difficult to run even for six months a year.

According to projedtions made by the Coconut Development Board, about 3,35,000 tonnes of milling copra are available. The total crushing capacity in the country is put at 3,162 tonnes for 24 hours per day, 1,710 tonnes of which is in the State. About 50 per cent of the crushing is done by the local units.

The board has estimated that there are 6,250 copra processing units in the State inclusive of the big Tata Oil Mills (in Tatapuram) and the two coconut complexes in Maimam (in Trivandrum) and in Calicut run by the Coconut Development Corporation. There are half a dozen more big units also.

The crux of the problem lies in the total availability of copra for processing by indigenous units. Available figures show that there are about 2,000 rotary mills and 100 expeller units with an installed capacity of 8,000 rotaries and 400 expellers in the State.

Requirement of the expeller units would be about 320 lakh tonnes, calculated on the basis of crushing capacity of four tonnes in two shifts of eight hours per day, 200 days a year. Calculating it on the basis of crushing capacity of two quintals per shift of eight hours, it was estimated that the rotaries alone would require 6.40 lakh tonnes of copra for working two shifts a day for 200 days a year.

The quantity of exports has been on the rise from 1980 onwards till 1982 when the coconut production nosedived due to unprecedented drought in 1983. The total exports in 1980-81 was 95,535 tonnes and it was 95,445 tonnes the next year. It has come down to 70,000 tonnes in 1983-84.

At the same time, availability of coconuts also came down from 3,000 million tonnes in 1980-81 to 1,905 million in 1983-84, when the after-effects of the drought were felt very much.

There has been a 40 per cent increase in copra availability now due to good coconut yield. The copious rains in the last monsoon has brought the "bumper". But the increased quantum will be naturally taken away by the exporters in the event of the recent price fall.

The (4/85) price of copra fell this week creating panic among coconut farmers and traders. Some attribute the fall in increased availability while some say that the taste of the general public for coconut oil has been changed due to the increased availability of palm oil in ration shops. This can be assessed from the poor demand and low volume of trade recorded when the oil price level touched the nadir on April 1 at Rs.2,060 a quintal.

It is true that the price had been fluctuating. From Rs.1,250 per quintal in 1980 it has rose up to Rs.3,929 on June 19 in 1984, which is the highest price ever recorded in the market.

The Kerala copra is finding its way to markets in Maharashtra and West Bengal. It is interesting to note that 62 per cent of the copra crushed in the country is in Kerala. The balance crushed in other states, include 33 per cent from Karnataka and 5 per cent from Tamil Nadu.

COCONUT AND ITS PRODUCTS

Tender coconut

Tender coconuts are used in large numbers in all coconut producing countries. The tender nuts are valued both for the sweet water they contain which is a refreshing drink and the gelatinous kernel which is a delicious food. The kernel is eaten as such or mixed with sugar or jaggery (gur) and beaten rice.

Mature coconuts

Mature coconuts are used for copra making, for edible purposes such as fresh kernel, for religious offerings and for raising seedlings. It has been estimated that 5 lakh metric tons of mature coconut kernel are used for edible purposes in India. It is considered a very auspicious fruit and often forms a part of the religious or sacrificial offerings. Coconuts are also given as presents in token of friendship, homage, repsect or goodwill on the occasion of Hindu marriage and other ceremonies.

Copra

Copra is the trade name for dried coconut meat or kernel. It contains 20-25 per cent protein of reasonably good nutritional quality. Freshly harvested or stored nuts are husked and split into halves and the water in the cups are drained. The cups are then kept close together out in the sun for drying with the kernel side facing up. After about 2 or 3 days drying, the kernel gets more or less detached from the shells. They are removed from the shells, if necessary with the help of a thin wooden or other type of lever. The kernels are again dried for another 4 or 5 days. To obtain good quality copra it is necessary to dry the cups in the sun continuously for 5-7 days. The copra is also dried in mechanical driers which pass heat or heat and smoke. The shells and husks of the nuts are frequently burned to provide the heat and smoke, e.g., Kiln drying. Several improvements over these types of kilns have been made for preparing copra.

Copra is usually graded on consideration of colour, cleanliness, moisture content, size and mouldiness. Treating copra with sulphur fumes during drying prevents discolouration, wards off insects and temporarily protects the product against mould and putrefaction. Copra is used for edible purposes and for extracting coconut oil. Copra is eaten as such or mixed with other dry fruits. It is also used in the preparation of sweets and as a garnish in many dishes.

Desiccated coconut

The white meat is passed through cutting or shredding machines of various types to produce chips or threads of various degrees of finess. These are dried in the hot air driers and packed for export in tin-lined cases. Tend-o-nut is the trade name given to desiccated coconut subjected to a tenderising and sweetening process. It contains 60 per cent coconut, 38 per cent sugar and 2 per cent moisture. It is manufactured in about seven pleasant colours - rose, pink, brown, green, yellow, maroon and mauve. Desiccated coconut finds use in the preparation of confectionery, cakes, biscuits, pastry, puddings, etc. It can be eaten without further preparation, mixed with warm milk, tea or water just enough to soften the shreds.

Coconut oil

When the kernel is dried into copra the percentage of fat rises to 63-65 per cent. Copra is fairly resistant to mould, rancidity and putrefaction and when protected from insects and rodents by good packaging and or refrigeration below 50°F it can be stored for many months or shipped to remote points of the world for oil extraction.

Copra is crushed both by village Chakkies or ghannies and power mills equipped with rotors and/or expellers. The coconut oil is used for edible purposes and besides has several other uses, viz., toilet and cosmetic purpose (face creams, shampoos, soaps): as illuminant and lubricant; in the manufacture of margarins and synthetic rubber manufacture; in chemical warfare; in the manufacture of hydraulic brake fluid for aeroplanes for the manufacture of synthetic resins; for the manufacture of insedticides, germicides, etc., and lastly in the manufacture of glycerine.

Coconut oil cake or Poonac

Coconut oil cake is the residue left after extracting oil from copra. It contains 20 per cent protein and it is utilised mainly as cattle feed and in

recent years, considerable interest is being evinced in the use of the cake as a protein supplement to human diet, since the quality of its protein is as good as those of groundnut and Bengalgram.

Coconut water

The water of a tender coconut, technically the liquid endosperm, is perhaps the most pure, nutritious and wholesome beverage that nature has provided for the sun-scorched children of the tropics. It is in one of nature's most perfect package and is said to keep the body cool, prevent prickly heat and summer boils. It is believed to subside the rashes caused by small pox, chicken and measles.

The tender coconut water cannot be preserved. It is a local drink held in its original container (coconut shell) until it is released by punching a hole in one of the eyes. At the proper stage the liquid endosperm contains about 5 per cent sugar. It also contains minerals, amino acids and vitamin C ranging from 2.2 to 3.7 mg/100 ml. The water has a calorific value of 17.4 per 100 g. It ferments easily giving rise to alcohol and vinegar. In addition it has auxinic or growth promoting properties, and is liberally made use of in tissue culture techniques. In the early stage, the sugar in the coconut water is in the form of glucose and fructose, but as the nut reaches the fifth or sixth month it changes to sucrose. This happens at the same time as the 'meat' is laid down inside the shell. Simultaneously the sugar content decreases.

Toddy

Toddy is the fermented and exuded sweet juice that 'weeps' from the bruised coconut palm. The toddy which ferments rapidly may be used fresh or nearly fresh, or after it has been allowed to ferment and become quite alcoholic or after distillation or after it has turned to vinegar. Toddy contains 1.3 to 1.4 per cent sucrose and 0.02 to 0.03 per cent proteins.

Sweet toddy (Neera)

Neera is the unfermented toddy. It is a sweet refreshing and healthy drink. But if left in the absence of sufficient lime (calcium hydroxide), it ferments easily and gets converted into toddy. The Khadi and Village Industries Commission supports the production of Neera and is popularising this drink.

Jaggery (gur)

Neera is concentrated by boiling upto 118°C-120°C and when allowed to cool, it solidifies. The solid mass is known as coconut jaggery or gur. It is a sweetening agent and is used in the preparation of several dishes.

Coconut palm sugar

It is prepared from neera. Neera is delimed, clarified and is concentrated by heat in a shallow iron pan and when the temperature of the boiling liquid reaches 110°C it is poured into a crystalliser. After 24 hours, sugar crystals are formed. The 'rali' is then centrifuged and separated into sugar and molasses. The molasses can also be used in the preparation of beverages.

Vinegar

When the fermentation of toddy continues further, it becomes vinegar. This is extensively used for table purposes, for the manufacture of pickle and condiments and also to some extent in indigenous medicine.

Husk

The edible kernel of the coconut fruit is encased within a hard shell and outside this shell is a thick fibrous covering of husk. The most important commercial utilisation of husk is for the manufacture of coir. Husks are also utilised as fuel, as a surface and seedling pit mulch and also for burying in coconut gardens. The coir is used for mattings, carpets, brushmats, fibre mats, dusters, etc.

Shells

Coconut shells have always been used in domestic economy of the coconut growing countries in a variety of ways - as hookah shells, shell bottles, cups, etc. Local craftsmanship has therefore produced articles of very attractive appearance and characteristics of the native art of the various countries of origin - like lamps, stands, buttons, cuff-links, paper weights, musical instruments, spoons, bangles, etc. Shell charcoal is used by goldsmiths in melting gold and silver, and for other metal work including brass. It is also used extensively after further processing for making gas masks, activated carbon, etc.

Leaves

Coconut leaves are "plaited" and used for thatching houses, for covering retting pits, making partition walls, in separating different lots of husks retted in linear trenches, for making baskets, etc. Unplaited coconut leaves are also used for shading seedlings, mulching nursery beds, for fencing, etc. The dry leaflets are tied into small bundles and used in villages as country torches in the night. The mid ribs of leaves are utilised for making brooms, baskets, fish traps, etc.

Petioles, bunch stalks, spathes, stipules, etc., are mostly used as fuel.

Trunk

The trunks of old coconut trees are utilised as timber for house construction. The quality of the timber can be improved by soaking it in saline water for some time.

Edible parts

The apple or cotyledon developing during germination, and the tender bud are delicious. The tender husks of some varieties are edible and are sometimes pickled. Several coconut products and parts of the palm are also used for various medicinal purposes.

ANNEXURE

COCONUTS : Statewise trend in Production (Million nuts)

State	68/69	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83
Andhra Pradesh	186	163	173	167	162	165	169	170.7	175.2	178.8	178.8
Assam	11	11	11	13	25	31	34	36.3	36.3	45.9	44.0
Karnataka	449	730	721	767	803	810	813	873.3	883.8	897.8	930.1
Kerala	3834	3703	3719	3440	3348	3053	3075	3032.1	3036.4	3057.2	2444.2
Maharashtra	33	44	51	54	51	50	43	57.5	61.7	61.1	61.1
Orissa	27	40	43	44	53	59	73	90.1	98.8	98.8	97.9
Tamil Nadu	735	843	1091	1099	1095	1039	1057	1154.1	1132.4	1019.2	1434.6
Tripura	*	1	1	1	1	1	1	1.5	1.5	1.7	1.7
West Bengal	22	22	22	22	22	22	22	22.0	32.3	32.3	29.4
Andaman	38	62	62	63	64	59	61	76.6	97.8	97.8	96.5
Goa, Daman, Diu	70	98	98	122	104	86	85	85.0	85.0	91.0	100.0
Lakshadweep	-	21	21	21	22	22	22	20.8	20.8	21.7	21.7
Pondicherry	15	15	17	16	16	16	16	16.0	15.4	15.4	15.5
Total	5546	5851	6030	5829	5765	5413	5471	5636.0	5677.4	5618.7	5455.5

ANNEXURE

COCONUT-AREA PRODUCTION & YIELD

State	1977-78			1978-79			1982-83		
	A	P	Y	A	P	Y	A	P	Y
Andhra Pradesh	40	165	4125	41	169	4122	45	178	3955
Assam	5	31	6200	5	34	6800	7	44	6285
Karnataka	156	810	5192	156	813	5212	179	930	5195
Kerala	674	3053	4530	679	3075	4529	659	2444	3708
Maharashtra	9	50	5556	9	43	4778	11	61	5545
Orissa	14	59	4214	17	73	4294	23	97	4217
Tamil Nadu	110	1039	9446	111	1057	9523	144	1434	9958
Tripura	1	1	1000	1	1	1000	1	1	1000
West Bengal	6	22	3667	6	22	3667	3	29	9666
Andaman	19	59	3105	19	61	3211	21	96	4571
Goa, Daman	19	86	4526	19	85	4475	19	100	5263
Lakshadweep	2	22	11000	2	22	11000	3	21	7000
Pondicherry	2	16	8000	2	16	8000	2	15	7500
Total	1057	5413	5121	1067	5471	5127	1117	5450	5681

Area (A) : '000 hectares
Production(P) : Million nuts
Yield (Y) : Nuts per hectare

ANNEXURE

MAJOR COCONUT GROWING DISTRICTS IN VARIOUS STATES

Andhra Pradesh	-	East Godavari
		West Godavari
Assam	-	Kamrup
		Nowgong
Karnataka	-	Tumkur
		Hassan
		Chitradurga
Kerala	-	Kozhikode
		Trivandrum
		Quilon
		Cannanore
		Mallapuram
Maharashtra	-	Ratnagiri
		Kulaba
Orissa	-	Puri
		Cuttack
Tamil Nadu	-	Thanjavur
		Coimbatore
		Salem
		Kanyakumari
		North Arcot

ANNEXURE

COCONUTS - All India trend in area Production & Yield
(1950-51 to 1978-79 & 1982-83)

Year	Area	Production	Yield
1950-51	622	3582	5759
1951-52	630	3606	5724
1952-53	651	4498	6909
1953-54	663	4649	7012
1954-55	641	4409	6878
1955-56	647	4226	6532
1956-57	657	4383	6671
1957-58	666	4455	6689
1958-59	690	4589	6651
1959-60	715	4734	6621
1960-61	717	4639	6470
1961-62	723	4478	6194
1962-63	798	5017	6287
1963-64	798	4725	5921
1964-65	848	5043	5947
1965-66	884	5035	5696
1966-67	893	5192	5814
1967-68	924	5321	5759
1968-69	983	5546	5613
1969-70	1033	5859	5672
1970-71	1046	6075	5808
1971-72	1088	6124	5629
1972-73	1099	5997	5457
1973-74	1102	5851	5309
1974-75	1116	6030	5403
1975-76	1070	5829	5448
1976-77	1075	5765	5363
1977-78	1057	5413	5121
1978-79	1067	5471	5127
1982-83	1117	5450	5681

ANNEXURE

1. Mean productivity of coconuts (nuts/hec) in the different states (period: 1972-82)

State	Productivity
Andhra Pradesh	4175
Assam	4903
Karnataka	5125
Kerala	4811
Maharashtra	5554
Orissa	4819
Tamil Nadu	9926
West Bengal	4584
Andaman & Nicobar Islands	3579
Goa	5083
Lakshadweep	7550
Pondicherry	9500
All India	5309

2. Performance of high yielding coconut cultivars and hybrids (CPCRI, Kasargod)

Cultivar/Hybrid	Main Yield			% increase over national average
	Nuts/ palm/ year	Copra (g/nut)	Oil (Tonne/ hectare)	
1. National average	30	150	0.51	-
2. Laccadive ordinary Good Management	127	169	2.44	378
3. Kappadam "	90	299	3.06	500
4. Andaman giant "	110	181	2.26	343
5. S.S.Green "	97	189	2.09	310
6. Philippines ordinary"	110	198	2.48	386
7. CDO x WCT "	130	215	3.18	524
8. WCT x CDO "	114	187	2.42	373
9. WCT x Gangabondam "	86	191	1.87	267

ANNEXURE

3. Performance of coconut under different Management Conditions

Type of Management	Mean annual yield		% increase over National average
	Nut/palm	Oil (T/Hec)	
1. National average	30	0.51	-
2. West coast Tall-rainfed-Kerala			
a. Farmers' practice	27	0.50	-
b. Farmers' field-manured	58	1.08	112
c. Experimental Farm - cultivation alone	38	0.71	39
d. " cultivation and manuring with organics & inorganics	62	1.16	127
e. " irrigated and manured (12 yrs old)	75	1.76	245
f. " mixed cropping with cacao under irrigation and manuring	111	2.60	410

ANNEXURE

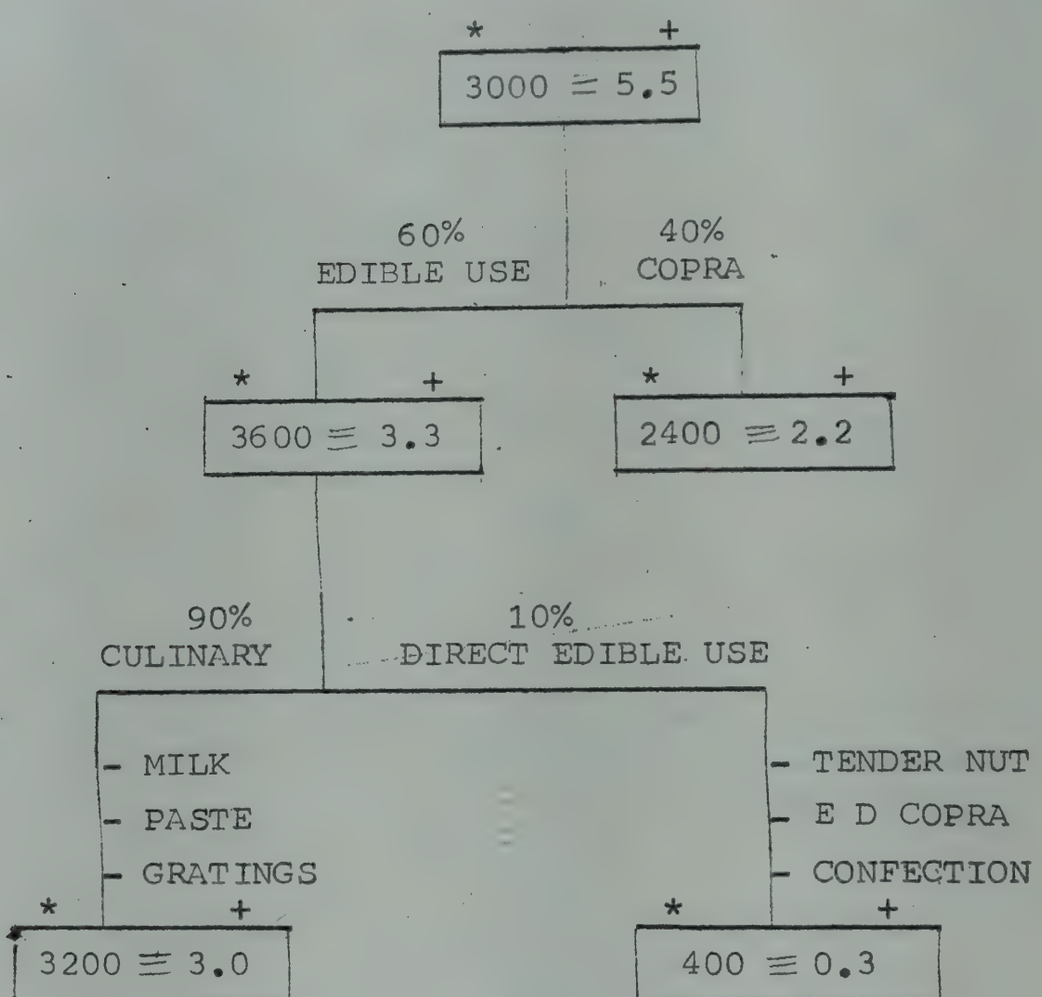
COMPOSITION OF COCONUT PRODUCTS

Material	Moisture % g	Protein % g	Fat % g	Carbo-hydrate % g	Fibre % g	Ash % g	Calo-ries
Tender coconut water	93.9	0.1	0.1	5.9	..	0.1	24
Coconut water	93.9	0.2	0.1	5.6	..	0.3	24
Tender coconut	90.8	0.9	1.4	6.3	..	0.6	41
Kernel of matured coconut	36.3	4.5	41.6	13.0	3.6	1.0	444
Copra	4.3	6.8	62.3	18.4	1.6	6.6	662
Coconut cake	11.43	17.73	14.23	40.63	10.96	5.0	379
Toddy, sweet	96.2	0.1	0.1	3.4	..	0.2	15
Toddy	98.3	0.2	0.2	1.2	..	0.1	7
Coconut sugar	0.6	0.3	0.1	98.6	..	0.4	396
Coconut jaggery	10.3	1.0	0.2	83.5	..	5.0	340

Source: Ind.Coconut J.

ANNEXURE

UTILIZATION OF COCONUT IN INDIA

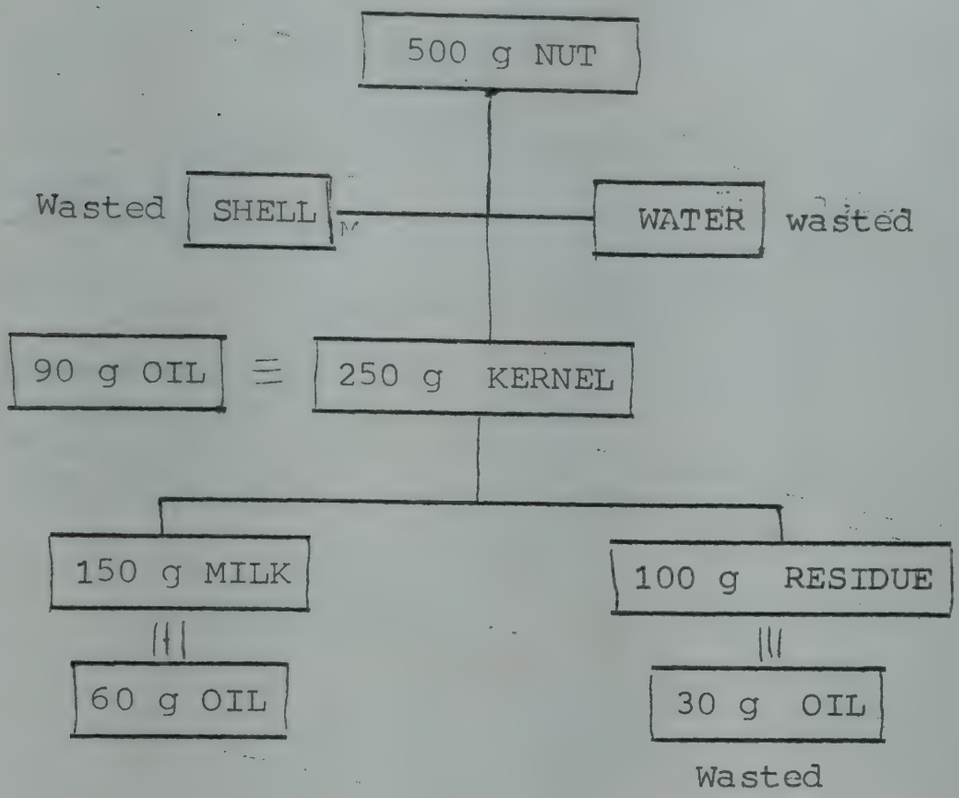


* Million Nuts per annum

\+ Oil equivalent in lakhs tonnes

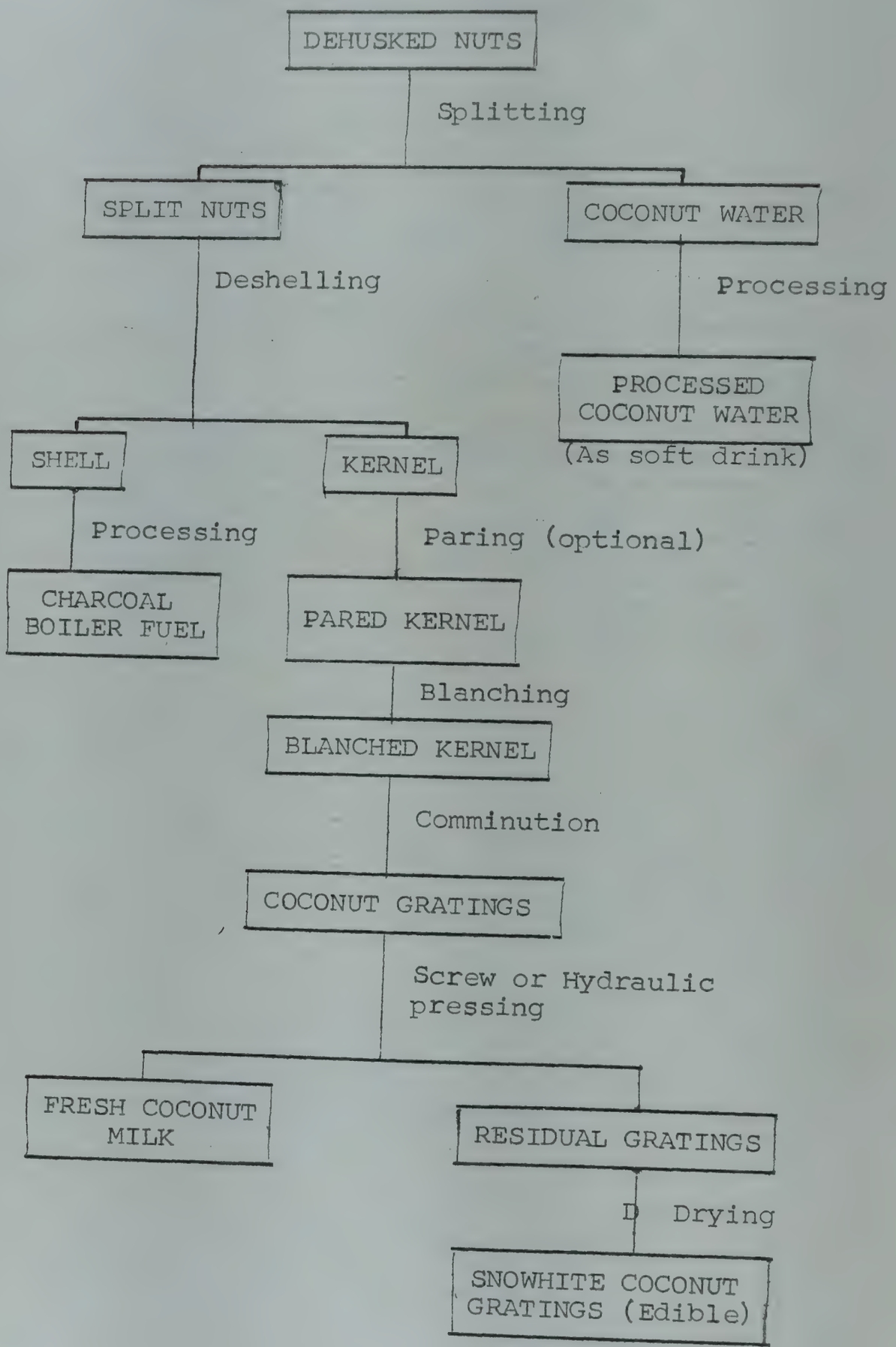
ANNEXURE

DOMESTIC PROCESSING OF COCONUT



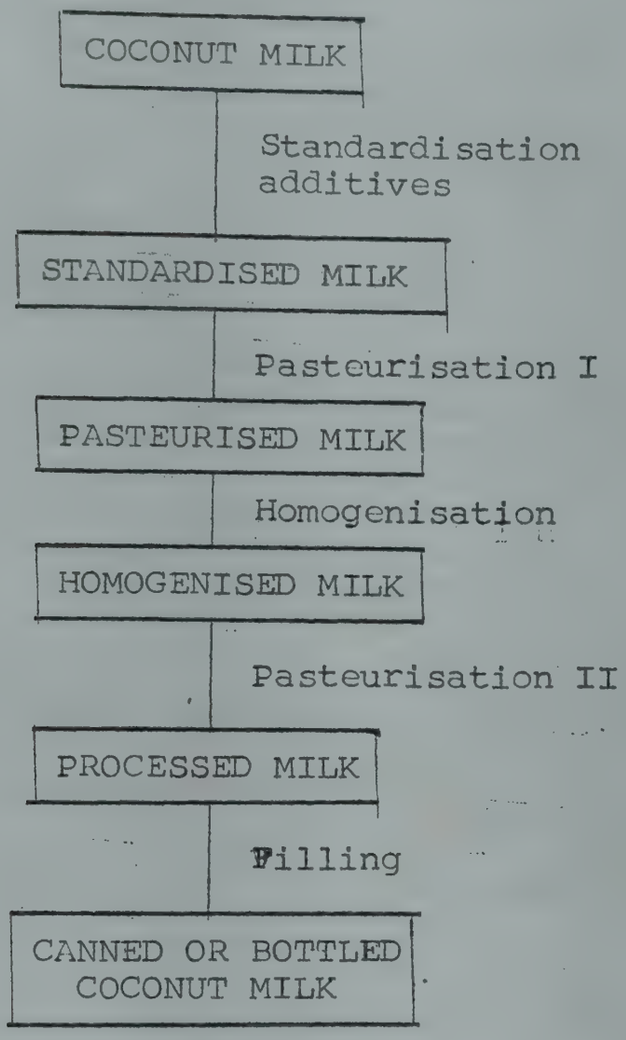
ANNEXURE

EXTRACTION OF COCONUT MILK



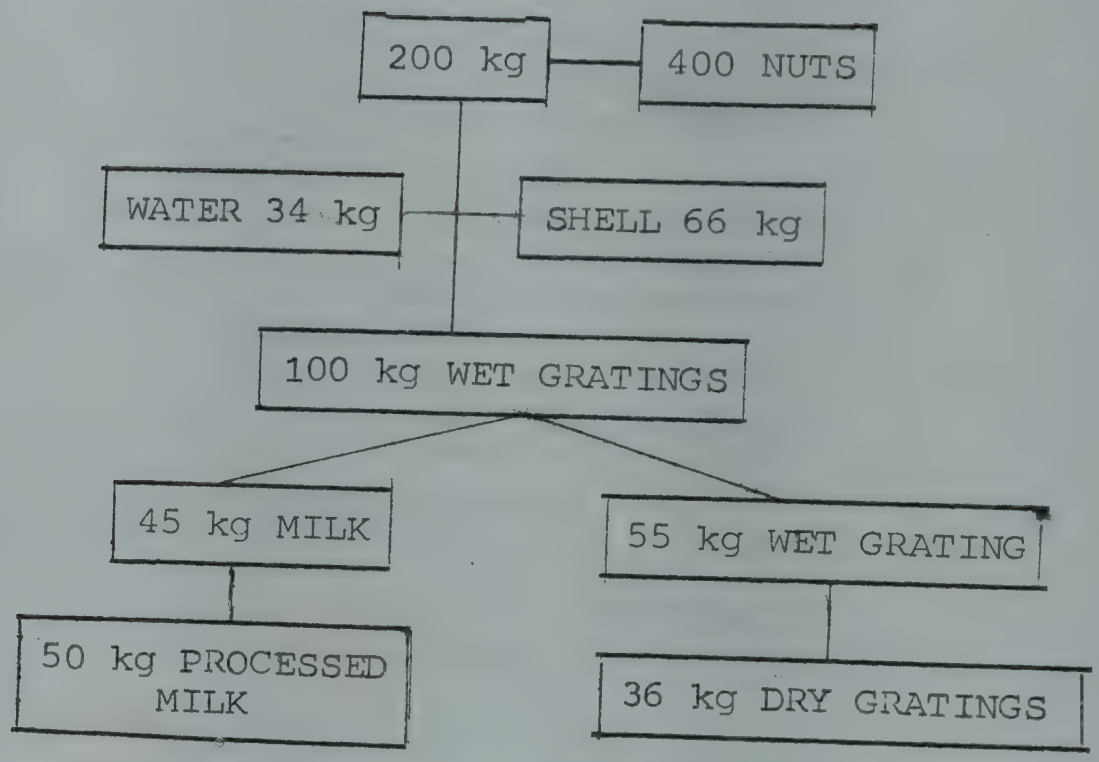
ANNEXURE

PROCESSING OF COCONUT MILK

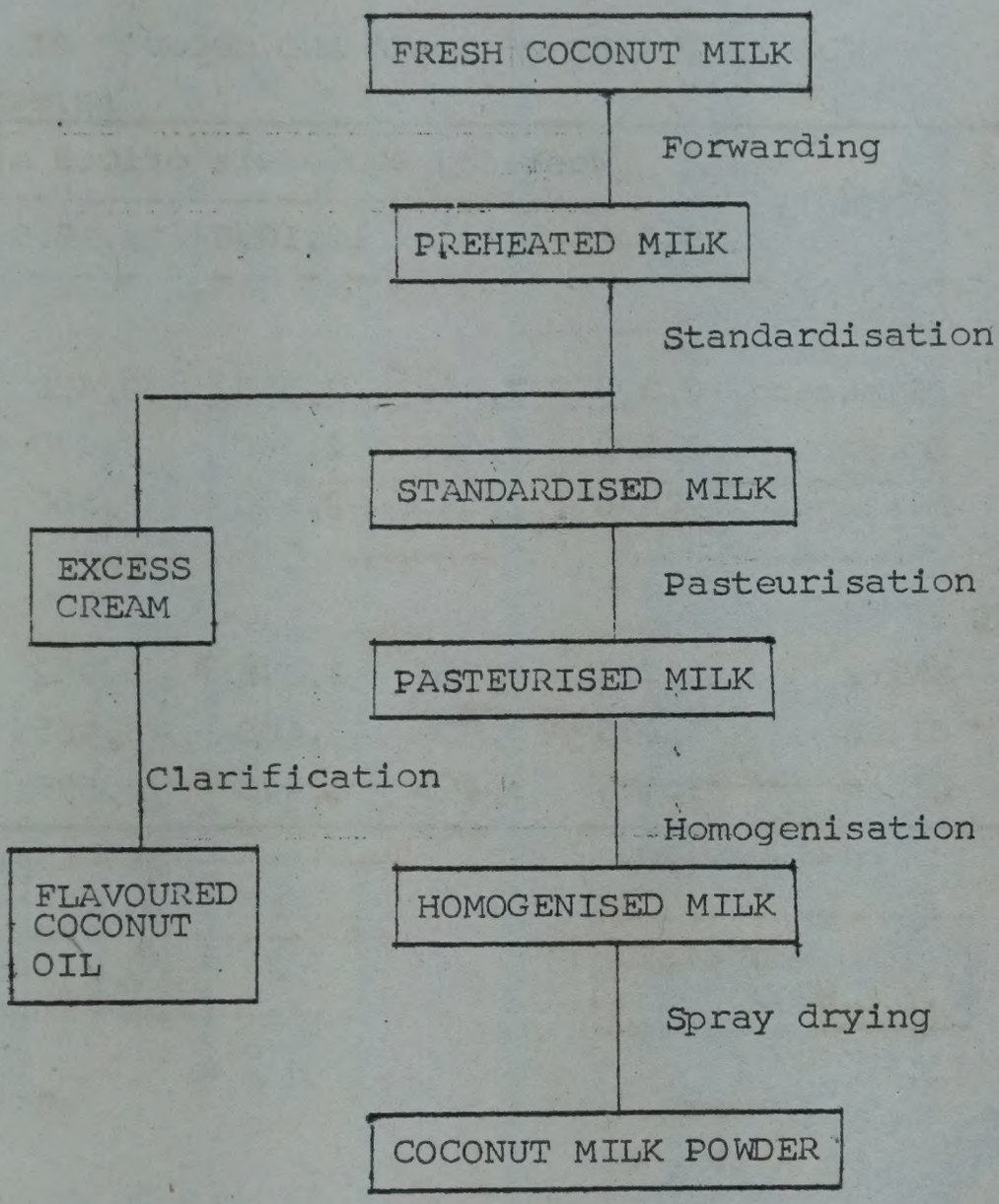


ANNEXURE

MATERIAL BALANCE



ANNEXURE


FRESH COCONUT MILK
Forwarding
PREHEATED MILK
Standardisation
STANDARDISED MILK
EXCESS CREAM
Pasteurisation
PASTEURISED MILK
Clarification
Homogenisation
FLAVOURED COCONUT OIL
HOMOGENISED MILK
Spray drying
COCONUT MILK POWDER

ANNEXURE

WHOLESALE PRICES OF COPRA AND COCONUT OIL

(Rs.per quintal)

Centre	Variety	Week-end wholesale prices as on				
		28.9.84	5.10.84	12.10.84	19.10.84	26.10.84
COPRA						
Kozhikode	Dilpasand	2,325	2,350	2,350	2,450	2,325
Alleppey	Smoked	2,320	2,380	2,380	2,430	2,260
Bombay	Milling	2,450	2,525	2,500	2,600	2,600
COCONUT OIL						
Bombay	White	3,744	3,796	3,848	3,952	3,744
Alleppey	Clean	3,475	3,500	3,600	3,655	3,425
Kozhikode	Clean	3,475	3,450	3,475	3,575	3,550

विज्ञान संदेश

विज्ञान दीवार समाचार पत्र | पंजीकरण संख्या 53392/91 | मासिक संस्करण

नावश टूट गया। अत: टूटे जीवाश्म-अण्डे
ीतरी भाग की परीक्षा की गई। इसके
ी भाग की जांच करने पर देखा गया
समें कार्बनिक पदार्थ और ऍमिनो ऍसिड
न हैं। बीजिंग विश्वविद्यालय के प्रोफेसर
ॅंगलियांग ने इसके 90 मिलीग्राम ऊनी
से डीएनए निचोड़ने में सफलता हासिल

मोटापा दूर करेगी मोटी मछलियां

—रणकिशोर सहाय

मोटे व्यक्तियों के लिए मछली का तेल नई आशा का संदेश लेकर आया है। वंशागत मोटे चूहों के उदर के क्षेत्र में चर्बी का जमाव घट जाता है और इस प्रकार वे दुबले दिखने लग जाते हैं। वैज्ञानिकों के अनुसार पेट पर चर्बी का जमाव रोकने में सक्षम तत्व वस्तुत: तेल में उपस्थित आइकोसिपैन्टिनोइक अम्ल उत्तरदायी है। मछली-तेल का यह विशेष अम्ल रक्त में ट्राइग्लाइसेराइडों